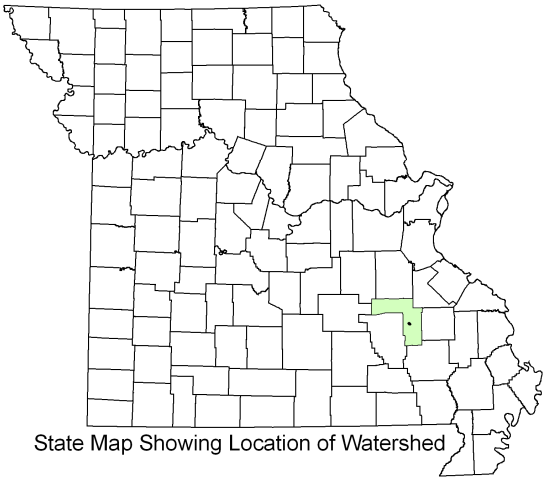
Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Scoggins Branch

Water Body Segment at a Glance:

County: Iron
Nearby Cities: Glover
Length of impaired segment: 0.5 miles
Pollutants: Cadmium and Zinc in water
Source: Glover Smelter site
Water Body ID: 2916U-01



State Map Showing Location of Watershed

Scheduled for TMDL development: 2017

Description of the Problem

Beneficial uses of Scoggins Branch

- The affected portion of Scoggins Branch is not classified so no beneficial uses are assigned to it; however, all water bodies in Missouri are protected by the general criteria (standards) contained in Missouri's Water Quality Standards (WQS), 10 CSR 20-7.031.

Use that is impaired

- General Criteria

Standards that apply

- All water bodies in Missouri are protected by the general criteria contained in Missouri's Water Quality Standards (WQS), 10 CSR20-7.031(3). These criteria are also called narrative criteria The particular general criteria that apply to Scoggins Branch are:

  (D) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life.
  (G) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.
  (I) Waters in mixing zones and unclassified waters which support aquatic life on an intermittent basis shall be subject to the following requirements:
  1. The acute toxicity criteria[1] of Tables A and B and the requirements of subsection (4)(B)

[1] Acute criteria apply to short exposures to toxic conditions that aquatic creatures can survive without harm. Chronic criteria apply to conditions producing adverse effects on aquatic life or wildlife following long-term exposure but having no readily observable effect over a short time period. Chronic criteria are much lower than the acute criteria.

- Missouri WQS found in 10 CSR 20-7.031(4)(B)1 state:

  Water contaminants shall not cause the criteria in Tables A and B to be exceeded. Concentrations of these substances in bottom sediments or waters shall not harm benthic organisms and shall not accumulate through the food chain in harmful concentrations, nor shall state and federal maximum fish tissue levels for fish consumption be exceeded.

- Table A of the WQS contains dissolved metals criteria for the protection of the aquatic life designated use. The acute criteria from Table A apply to unclassified water bodies. These criteria are hardness dependent and (for cadmium and zinc) are calculated from the formulas shown below:

Dissolved Zinc = $e^{(0.8473*\ln(\text{hardness}) + 0.884211)} * 0.978 = \mu g/L$, or micrograms per liter

Dissolved Cadmium = $e^{(1.0166*\ln(\text{hardness})-3.062490)}*(1.136672- (\ln(\text{hardness})*0.041838)) = \mu g/L$

Background information and water quality data

Scroggins Branch is a small, unclassified tributary to Big Creek in southern Iron County. It is the receiving stream for discharge from Glover Smelter. Evidence for metals impairment is based on data gathered by the department in 2008 and 2009. Three samples were collected and all three samples exceeded acute criteria for both cadmium and zinc.

Evidence from many studies and many types of studies shows that heavy metals are harmful, and often toxic, to aquatic life. Glover Smelter has smelted lead ore for years. Though it is currently not operating (since 2003), legacy contamination of metals remains in the surrounding water bodies.

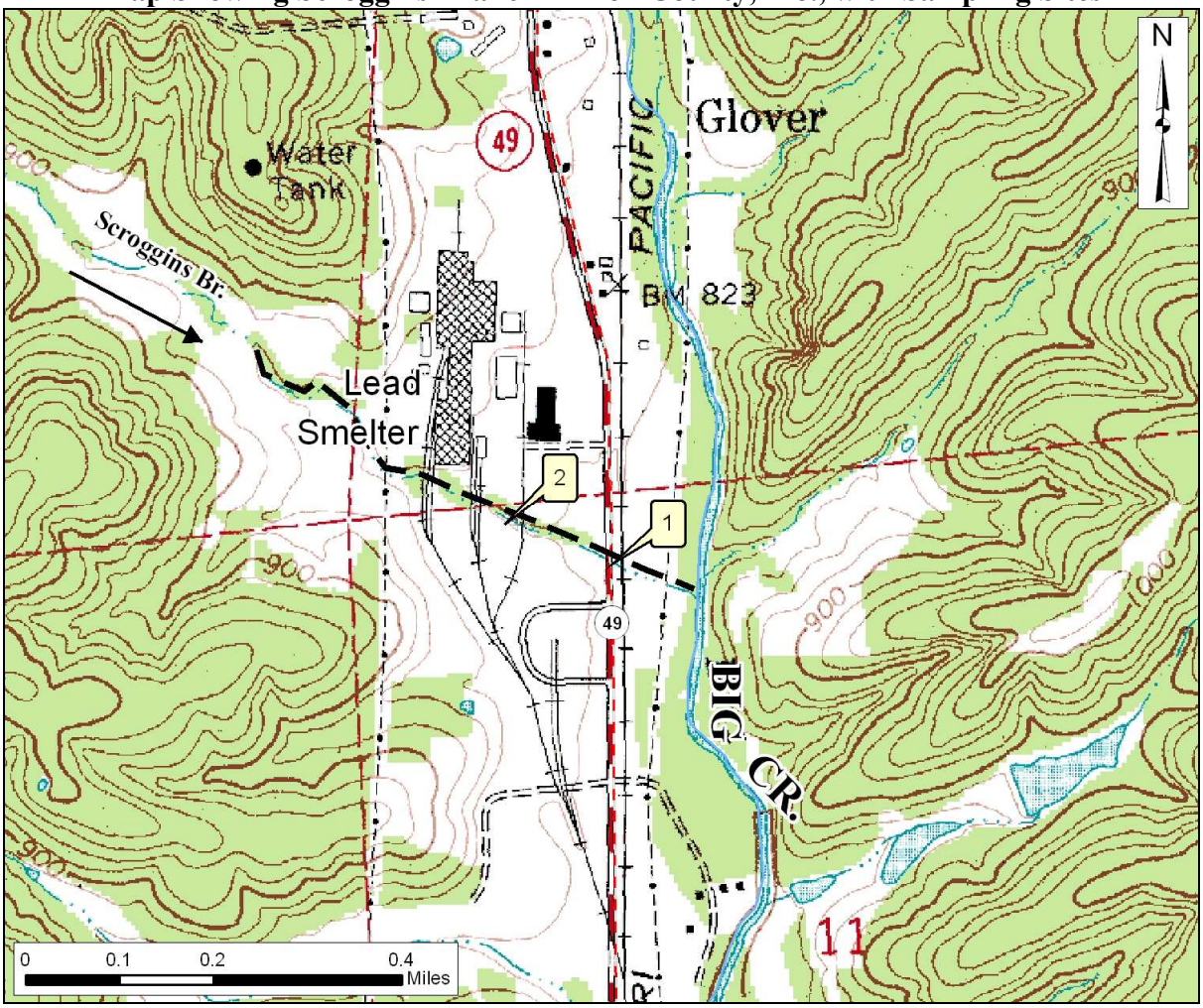
Dissolved Cadmium and Zinc Data for Scroggins Branch

Site	Site Name	Yr	Mo	Dy	DCd	DZn
1	Scroggins Br. Nr. Mouth	2008	6	12	26.8	1300
1	Scroggins Br. Nr. Mouth	2008	10	17	22.9	1200
2	Scroggins Br. Nr. Mouth	2009	3	26	13.5	606

DCd = dissolved Cadmium, DZn = dissolved Zinc
Shaded cells show exceedance of acute criteria

Both zinc and cadmium are minor components in most lead ores and therefore are by-products of lead production. Although zinc is an essential requirement for good health as a trace mineral, excess zinc can be highly toxic. With the exception of its use in nickel-cadmium batteries, the use of cadmium is generally decreasing in all other applications, such as pigments and corrosion resistant plating. This decrease is due to the high toxicity and carcinogenicity of cadmium.

Map Showing Scroggins Branch in Iron County, Mo., with Sampling Sites



Sample Sites

1 – Scroggins Branch below Glover Smelter
2 – Glover Smelter Outfall 003

For more information call or write:

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